



GROUNDWATER EI

In-depth Review of GROUNDWATER EI

- Migration of Contaminated Groundwater Under Control
- RCRIS code CA750
- Background/Cover memo
- Flowchart
- Questions - slightly abbreviated in slides
- Response criteria - abbreviated in notes
- Full text in 2/5/99 Guidance

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Reference

“RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA750),” US EPA, Interim Final 1/5/99.

GROUNDWATER EI - Question 1

- Has
 - all available relevant/significant information
 - on known and reasonably suspected releases
 - subject to RCRA Corrective Action (e.g., SWMU, RU, AOC)been considered in this EI determination?
- A “no brainer” gentle reminder

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Migration of Contaminated Groundwater Under Control EI

- There are two primary elements:
 - 1) The stability of geospatial (horizontal and vertical) dimensions of “contaminated” groundwater
 - 2) Impacts of discharges of “contaminated” groundwater into surface water, if any
- Ongoing monitoring is required to document both stabilization of migration and impacts to surface water (by contamination)*



Notes:

* Ongoing monitoring is typically only required where “contamination” has been identified (i.e., concentrations above “levels of concern”).

Definition of Groundwater EI

Key components:

- A positive determination means the physical migration of contaminated groundwater has been stabilized (and impacts to surface water are currently acceptable)
- Monitoring will be conducted to confirm
- Should reflect all contaminants of concern present above appropriate levels of concern
- Site-wide



Notes:

The Migration of Contaminated Groundwater Under Control is identified by RCRIS status code CA750

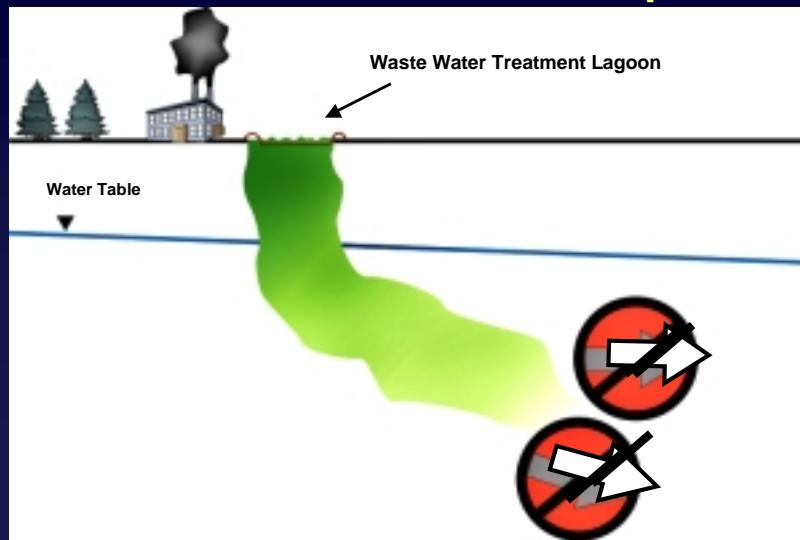
Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility, i.e., site-wide).

Site-wide criterion applies even if another program (e.g., State, voluntary, UST, or CERCLA) is working on part of the facility.

The previous (1994) title (Groundwater Releases Controlled") did not clearly identify that the determination applied only to the physical movement of the outside boundary of contamination and even though the full text explained this, the title implied to some readers that it also included elements of source control. This title also implied to many readers that physical remedial measures were taken, when remedial actions (other than investigation, evaluation, and perhaps continued monitoring) may not have been necessary in all cases to ensure that the migration of contaminated groundwater was under control.

“Migration of Contaminated Groundwater Under Control” Environmental Indicator - Dissolved Plume Example



Notes:

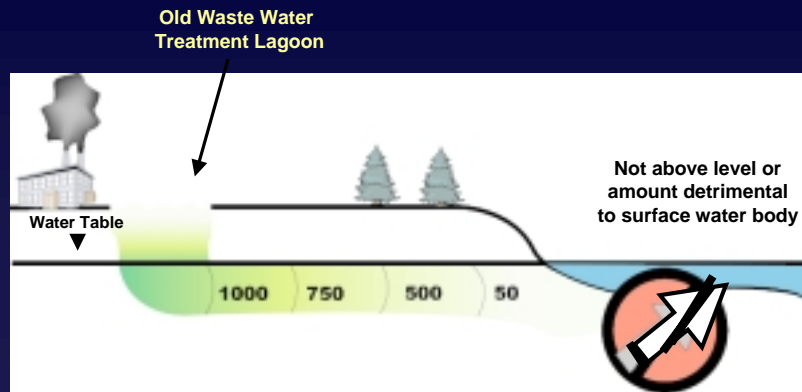
This illustration shows only a simple dissolved phase plume.

However, be aware that contaminants in a separate phase (“pure product”), for example,

- floating (LNAPL-Light Non-Aqueous Phase Liquids) like gasoline, or
 - sinking (DNAPL - Dense Non-Aqueous Phase Liquids) like TCE, or perhaps
 - neutral buoyancy (NNAPL - Neutral Non-Aqueous Phase Liquids) due to pure mixtures of light and dense chemicals
- [may move in different directions, at different speeds, and due to different mechanisms (e.g., up-(water-table) gradient or down strata dip regardless of water pressure head and flow direction).]

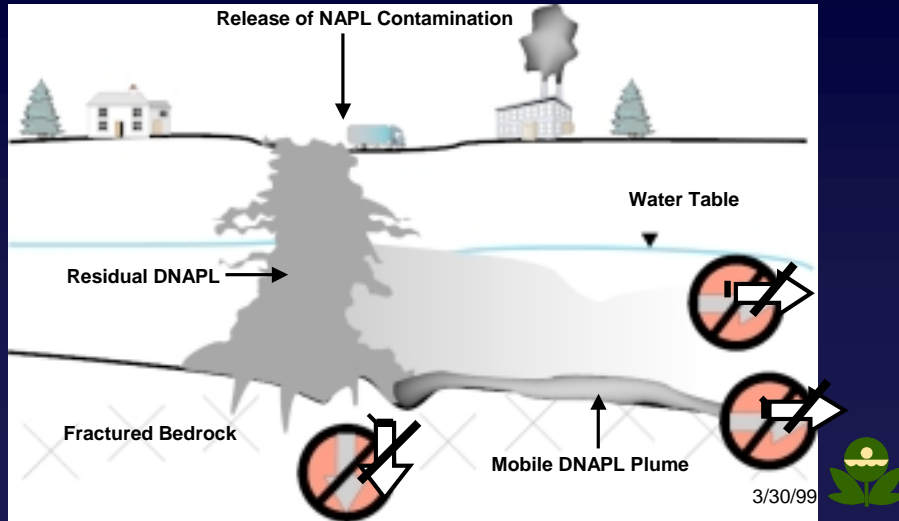
“Migration of Contaminated Groundwater Under Control” Environmental Indicator –

Dissolved Groundwater Plume Discharging to Surface Water Example



“Migration of Contaminated Groundwater Under Control” Environmental Indicator -

Dissolved and NAPL Plume Example



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Groundwater EI Evaluation and Documentation Guidance

Tiered seven-step screening process:

- Has all relevant data been evaluated?
- Is groundwater “contaminated” above aquifer-appropriate, risk-based levels?
- Does monitoring data demonstrate horizontal and vertical migration has stabilized?
- Does contaminated groundwater discharge to surface water?



Notes:

This slide presents an easy-to-read introduction to the EI guidance questions.

These questions will be discussed in more depth in the next section of this presentation.

The full text of these questions is in the 2/5/99 guidance.

These questions are summarized and their functional relationships are illustrated in the EI flowchart.

Groundwater EI Evaluation and Documentation Guidance (Cont.)

Tiered seven-step screening process (cont.):

- Is the discharge of contaminated groundwater into surface water likely to be insignificant (<10x gw std and no other issues criteria)?
- Are impacts to surface water, sediments, and ecosystems “currently” acceptable?
- Is there adequate monitoring to document no migration and no unacceptable impact to surface water?



Migration of Contaminated Groundwater Under Control EI

Summary and key points:

- Three possible answers (“YE,” “NO,” & “IN”)
- Limited migration permissible if part of “formal” natural attenuation remedy (i.e., involving public participation)
- Background conditions considered in EI
- Predictive modeling may be a component, but monitoring is required to demonstrate a “YE” (with “contamination”)



Notes:

Our 2005 goal for the Groundwater EI is only 70% due to the recognition of physical limitations that can prevent the physical control of plume migration.

The EI guidance was constructed to allow limited migration under “formal” natural attenuation remedies (i.e., where stabilization is expected in the near future and public has acknowledged this assessment/decision).

GROUNDWATER EI - Question 2

Is Groundwater

- known or reasonably suspected to be "contaminated"
- above appropriately protective "levels" (i.e., standards, guidelines, guidance, or criteria for protection of resource & beneficial uses)
- from releases subject to RCRA Corrective Action
- anywhere at or from the facility?



GROUNDWATER EI - Question 3

Has the migration of contaminated groundwater stabilized

- within “existing area of contaminated groundwater”
- as defined by the monitoring locations designated at the time of this determination (i.e, monitoring locations that define the plume)
- both horizontal and vertical dimensions?



GROUNDWATER EI - Question 4

Does “contaminated” groundwater

- discharge into surface water bodies?
- “contaminated” => aquifer “levels” (stds)
- aquifer “levels” (stds) may be for the protection of surface water



GROUNDWATER EI - Question 5

Is the discharge of “contaminated” groundwater into surface water

- likely to be “insignificant” (i.e., maximum concentration $<10\times$ the appropriate groundwater “level”)
- and there are no “other conditions”
 - which significantly increase the potential for unacceptable impacts to surface water, sediments, or ecosystems?

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GROUNDWATER EI - Question 6

Can the discharge of “contaminated” groundwater into surface water

- be shown to be “currently acceptable”
 - not cause impacts to surface water, sediments, or ecosystems
 - that should not be allowed to continue until a final remedy can be implemented?
- this is a rapidly developing field, look to the latest guidance on methods and scale of demonstration

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GROUNDWATER EI - Question 7

Will groundwater monitoring/measurement data (and surface water/sediment/ecological data, as necessary)

- be collected in the future to verify that “contaminated” groundwater has remained within
 - the horizontal (or vertical, as necessary) dimensions of the “existing area of contaminated groundwater?”



GROUNDWATER EI - Question 8

- Check the appropriate RCRIS status codes for Migration of Contaminated Groundwater Under Control EI event code CA750
- Obtain supervisor (or appropriate manager) signature and date on the EI determination below
- Attach appropriate supporting documentation as well as a map of the facility

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